Email: sbortz@ua.edu

Simon Bortz

Education

University of Missouri — Columbia, MO
Ph.D. in Mathematics, Advisor: Steve Hofmann — 2012-2016

Indiana University — Bloomington, IN
B.S. in Mathematics — 2006-2010

Appointments

University of Alabama — Tuscaloosa, AL
Assistant Professor — 2020-

University of Washington — Seattle, WA
Acting Assistant Professor — 2018-2020

University of Minnesota — Minneapolis, MN
Postdoc — 2016-2018

Mathematical Sciences Research Institute (MSRI) — Berkeley, CA
Postdoc — 1/17/17 - 5/26/17

Publications (* articles since coming to UA)

- *(with S. Hofmann, J.L. Luna Garcia, S. Mayboroda, B. Poggi) Perturbations for Second Order Elliptic Operators. Part II: Non-tangential maximal function estimates. Accepted at ARMA
- *(with T. Toro, Z. Zhao) Optimal Poisson kernel regularity for elliptic operators with Hölder continuous coefficients in vanishing chord-arc domains. J. Funct. Anal. 285 (2023), no. 5, Paper No. 110025, 64 pp.
- *(with M. Egert, O. Saari) Sobolev contractivity of gradient flow maximal functions. To appear in Adv. Calc. Var.
- *(with J. Hoffman, S. Hofmann, J.L. Luna Garcia, K. Nyström) Corona Decompositions for Parabolic Uniformly Rectifiable Sets. J. Geom. Anal. 33 (2023), no. 3, Paper No. 96.
- *(with T. Toro, Z. Zhao)Elliptic measures for Dahlberg-Kenig-Pipher operators: Asymptotically optimal estimates. Math. Ann. 385 (2023), no. 1-2, 881-919.
- *(with J. Hoffman, S. Hofmann, J.L. Luna Garcia, K. Nyström) Carleson measure estimates for caloric functions and parabolic uniformly rectifiable sets. Anal. PDE 16 (2023), no. 4, 1061-1088.
- *(with J. Hoffman, S. Hofmann, J.L. Luna Garcia, K. Nyström) Coronizations and big pieces in metric spaces. Ann. Inst. Fourier (Grenoble) 72 (2022), no. 5, 2037-2078.
- *(with J. Hoffman, S. Hofmann, J.L. Luna Garcia, K. Nyström) On Big Pieces approximations of parabolic hypersurfaces. To appear in Ann. Acad. Sci. Fenn. Math..
- *(with S. Hofmann, J.L. Luna Garcia, S. Mayboroda, B. Poggi) Critical perturbations for second-order elliptic operators, I: square function bounds for layer potentials. Anal. PDE 15 (2022), no. 5, 1215-1286.
- *(with M. Engelstein, M. Goering, T. Toro and Z. Zhao) Two Phase Free Boundary Problem for Poisson Kernels. Indiana Univ. Math. J. 71 (2022), no. 1, 251-306.
- *(with M. Egert and O. Saari) Note on time-regularity for weak solutions to parabolic systems of p-Laplace type. Proc. Amer. Math. Soc. 149 (2021), no. 4, 1677-1685.
- (with Olli Tapiola) ϵ-Approximability of Harmonic Functions in L^p Implies Uniform Rectifiability, Proc. Amer. Math. Soc. 147 (2019), no. 5, 2107-2121.

- (with Steve Hofmann) Quantitative Fatou Theorems and Uniform Rectifiability. Potential Anal. 53 (2020), no. 1, 329–355.
- (with Pascal Auscher, Moritz Egert and Olli Saari) Non-local self-improving properties: A functional analytic approach. Tunisian J. Math. 1 (2019), no. 2, 151-183.
- (with Pascal Auscher, Moritz Egert and Olli Saari) Non-local Gehring lemmas. J. Geom. Anal. (2019)
- (with Pascal Auscher, Moritz Egert and Olli Saari) On regularity of weak solutions to parabolic systems, J. Math. Pures Appl. (9) 121 (2019) 216–243.
- (with Murat Akman, Steve Hofmann and José Maria Martell) Rectifiability, interior approximation and Harmonic Measure, Ark. Mat. 57 (2019), no. 1, 1-22.
- (with Steve Hofmann) A singular integral approach to a two phase free boundary problem, Proc. Amer. Math. Soc. 144 (2016), no. 9, 3959-3973.
- (with Steve Hofmann) Harmonic measure and approximation of uniformly rectifiable Sets, Rev. Mat. Iberoam. 33 (2017), no. 1, 351–373.

Preprints

- (with S. Hofmann, J.M. Martell, K. Nystrom) Solvability of the L^p Dirichlet problem for the heat equation is equivalent to parabolic uniform rectifiability in the case of a parabolic Lipschitz graph. arXiv:2306.17291
- (Bruno Poggi, Olli Tapiola, Xavier Tolsa) The A_∞ condition, ϵ-approximators, and Varopoulos extensions in uniform domains. arXiv:2302.13294.
- (with M. Egert, O. Saari) A Theorem of Fefferman, Kenig and Pipher Re-revisited. arXiv:2107.14217.

Scholarships and Awards

- Simons Collaboration Grant, 2022-2027. #959861, Amount:$42,000

Seminar and Colloquium Talks

- University of Pittsburgh Analysis/PDE Seminar, Jan. 29, 2024
- University of Missouri Analysis Seminar, Nov. 14, 2023
- HAPDEGMT in Bilbao, Bilbao, June 12–16, 2023
- PACZKI23 conference, Warsaw, Feb. 13-17, 2023
- Extremal Problems in Harmonic Analysis, Convexity, and Bellman Functions, Nov. 28 - Dec.2 ICERM 2022
- Barcelona Analysis Seminar, Feb. 14, 2022.
- PADS (Probability, Analysis and Data Science) Seminar , Dec. 1, 2021.
- AMS Western Sectional, Oct. 23, 2021.
- AMS Central Sectional, Oct. 9, 2021.
- PAW Seminar, Sept. 27, 2021.
- Continuum Mechanics Seminar, U. Nebraska, Sept. 9, 2021.
- HA-GMT-PDE Seminar (University of Minnesota), Feb. 1, 2021.
- Euskal Herriko Unibertsitatea Analysis Seminar, Nov. 12, 2020.
- University of Alabama Colloquium, January 29, 2020.
- SIAM Central States Section, October 19, 2019.
- University of Alabama Analysis Seminar, September 13, 2019.
- University of Oregon Analysis Seminar May 28, 2019.

- AMS Sectional Hartford, CT, April 13, 2019.
- University of Nebraska Colloquium, March 8, 2019.
- AMS Sectional: Nonlocal PDEs via Harmonic Analysis, SFSU,October 2018.
- University of Connecticut Analysis Seminar, March 2018.
- Harmonic Analysis in Winter, ICMAT-Madrid, January 2018.
- Nonsmooth Analysis: a Workshop for Postdocs, November 2017.
- Rainwater Seminar, University of Washington, October, 2017.
- MSRI Postdoc Seminar, MSRI, May 2017.
- AMS Sectional Meeting, Stony Brook University, March 2016.
- University of Missouri Analysis Seminar, February 2016.ss
- University of Minnesota PDE Seminar, November 2015.
- University of Missouri Analysis Seminar, September, 2015.
- Workshop in Harmonic Analysis, PDE, and Geometric Measure Theory, ICMAT- Madrid, January, 2015.
- University of Missouri Analysis Seminar, November, 2014.

Seminars and Workshops Organized

- University of Alabama Analysis Seminar Fall 2020 -
- University of Washington Rainwater Seminar Spring 2019 - Winter 2020
- AMS Sectional Meeting, Special Session : Harmonic Analysis and Partial Differential Equations. November 3-4, 2018.
- Research Term on Real Harmonic Analysis and Its Applications to Partial Differential Equations and Geometric Measure Theory, ICMAT-Madrid, May 7, 2018 - June 8, 2018.
- Workshop on Real Harmonic Analysis and its Applications to Partial Differential Equations and Geometric Measure Theory, ICMAT-Madrid, May 28, 2018 - June 1, 2018.
- Graduate Student Analysis Seminar at University of Missouri, Fall 2015-Spring 2016.
- Graduate Student Seminar at University of Missouri, Fall 2013-Spring 2014.

Service

- Graduate Admissions Committee, GASC.
- Referee for: Duke, ARMA, Advances in Math, Bulletin of the London Mathematical Society, Complex Analysis and its Synergies, Forum of Mathematics, Sigma, Journal of Mathematical Analysis and Applications, Potential Analysis, Proceedings of the AMS, Publicacions Matemàtiques, Rocky Mountain Journal of Mathematics, SIAM Journal on Mathematical Analysis.

Teaching(* courses at UA)

- ***Intro to Real Analysis II (M587)** Spring 2024
- ***Real Analysis II (M681)** Spring 2023
- ***Topics In Analysis** Spring 2022, Fall 2022
- ***Theory of Probability (Math 355)** Spring 2024, Fall 2022 (x2), Spring 2022, Spring 2021,Fall 2020

- ***Complex Variables (Math 485)** Spring 2021
- **Mathematical Analysis** Spring 2020,Aut 2019
- **Mathematical Analysis II** Win 2020
- **Ordinary Differential Equations** Spring 2019,Winter 2019, Aut 2018
- **Calculus 2** Spring 2018, Fall 2016, Fall 2014
- **Partial Differential Equations** Fall 2017
- **Advanced Calculus (TA)** Spring 2016
- **Calculus 3** Fall 2015,Spring 2015
- **Business Calculus** Fall 2014
- **Calculus 1 (TA)** Fall 2013